

TWO NEW SPECIES AND OTHER RECORDS OF SEA SPIDERS (PYCNOGONIDA: ARTHROPODA) FROM TROPICAL NORTH QUEENSLAND

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Five species of sea spiders found among the green intertidal algae *Cladophora prolifera* (Roth) and the coastal soft bottoms of Cleveland Bay off Townsville, are reported. Two new species are described; *Ammothella fistella* sp. nov., a closely related species of the appendiculata-group, and *Callipallene catulus* sp. nov., an extremely small species differentiated by its size and general body shape. Three species of *Anoplodactylus* are also recorded, *A. glandulifer* a widely distributed species, *A. cribellatus*, a recent synonym of the Australian *A. simplex*, and *A. tubiferus*, a long-known species from the West-Pacific. The finding of undescribed species in the alga *C. prolifera* encourages the interest on intertidal habitats that might serve as shelter for possibly many others small to tiny pycnogonids. □ Pycnogonida, *Ammothella*, *Callipallene*, *tropical sea spiders*.

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This is a report of a small collection of pycnogonids from Townsville, in tropical North Queensland. It comprises three named species plus the description of two new species, adding them to the list of 34 species known from Queensland. Studies on pycnogonid fauna from the North Queensland region are few and sporadic. Reports on the fauna have rarely been a result of active search. Instead, many of the specimens found were primarily taken from dredge and grab, or trawled samples, usually with expeditions (Clark, 1963; Child, 1975). In the last 20 years the only reports on sea spiders from Australia are those by Staples (1982), on pycnogonids from the vicinity of Gladstone, Child (1990) on the 15 species reported from the Great Barrier Reef, and Arango (2003) also recording new species from North Queensland. The present note constitutes a complement to that larger report on pycnogonids from tropical Queensland and nearby areas (Arango, 2003). The discovery of two new species of pycnogonids in a very small collection of green algae is an indication that the pycnogonid fauna of this region is much more diverse than previously thought, especially of very small forms of pycnogonids that predominate in a diversity of shallow water habitats.

Rowes Bay (19°15'S, 146°47'E) and Cleveland Bay constitute the area of collection of the present report. The intertidal habitat of Rowes Bay, composed of small boulders and a mixture of muddy and sandy sediment and a large diversity of benthic organisms and various algal species, was explored by the authors in different times of the year in 1998 and 1999. Aside from this, dredge and grab collections of the soft benthos of Cleveland Bay were obtained. *Anoplodactylus* species were dominant, followed by *Ammothella* and *Callipallene*. *Anoplodactylus glandulifer* Stoeck, 1954, *Ammothella fistella* sp. nov. and *Callipallene catulus* sp. nov. were collected among the algae *Cladophora prolifera* (Roth); while *A. cribellatus* Calman, 1923 (syn. *A. simplex* Clark, 1963) and *A. tubiferus* Haswell, 1884 were collected by dredge and grab in the muddy bottoms of Cleveland Bay.

Although the area of North Queensland might be a well-studied region regarding the pycnogonid fauna compared to other Australian regions, the two previously undescribed species in such a small collection suggests that little collecting has been done, especially of very small forms of sea spiders that predominate in a diversity of shallow water habitats.

SYSTEMATICS

AMMOTHEIDAE Dorhn 1881

Ammothella fistella sp. nov.

(Fig. 1)

ETYMOLOGY. Latin, *fistella*, diminutive of *fistula*, meaning a pipe, tube or ulcer; suggested by Dr C. Allan Child. It refers to the various tubular spines on the lateral processes and appendages.

MATERIAL. Townsville, Rowes Bay, intertidal rocky, found on the green alga, *Cladophora prolifera* (Roth) in 0.5m. April-November 1998, 1♂, holotype. (QM S105865), coll. Lee; April-November 1998. Paratypes, 1♂ with eggs, 3♀, 16 juv. paratypes (QMS105866), 4♂, 2♀, 1 juv., coll. Lee; April-Nov 1998, 1♂ with eggs, 1♀, 1 juv., (QMS105866), coll. Arango; Apr. 1999, 1♂, 4♀, 1 juv. (QMS105867), coll. Arango.

DISTRIBUTION. Known only from Rowes Bay, Townsville, Qld. 0.5m tidal height.

DESCRIPTION. Relatively small, leg span of 6.84mm. Trunk robust, spinose, with numerous short tubular and long pointed spines. Lateral processes separated by half their diameter or less, ornamented with three similar dorso-distal tubular spines, last pair of lateral processes with one single tubular spine: tubular spines all taller than their diameters. Abdomen long, curving posteriorly, bending horizontally at midpoint, ornamented with four short and two long tubular spines and four short pointed lateral spines. Ocular tubercle of moderate length, pointed anteriorly, $2.5 \times$ longer than distal diameter. Eyes large, darkly pigmented, located distally. Neck robust, expanded distally, without ornamentation. Proboscis typical, with swollen medial section, with proximal and distal constrictions. Chelifores slender, lightly spinose, with double jointed-scape, first segment slightly shorter than second, ornamented with one dorso-median tubular spine, one dorsodistal, two latero-distal tubular spines and two pointed spines of similar length. Second segment ornamented with 5-8 dorsal and lateral tubular spines and 3-4 dorsal pointed spines. Chelac reduced, distal end resembling club. Palps long, slender, without tubular spines, consisting of 9 segments, with ventro-distal spines slightly longer than their segment diameters. Ovigera typical, strigilis segments denticulated, with many lateral denticles. Two large and long setae located laterally on seventh segment. Legs slender, spinose, with large number of short and long pointed spines and numerous tubular spines; first coxae similar to anterior lateral process, with 3-4

dorsodistal tubular spines and 4-5 lateral and ventral pointed spines; second coxa has 3 dorso-median short tubular spines and very small ventro-distal spines; third coxae with 3 short ventro-distal spine; femur slightly shorter than subequal tibia; all leg segments armed with randomly located tubular spines, longer pointed spines dorsally and distally and short ventral spines. Cement gland dorso-distally, tube of slightly longer than segment diameter, carried horizontally; tarsus short, propodus well curved, with 4 heel spines and 6-7 sole spines, several dorsal setae located randomly; claws half as long as propodus, auxiliary claws long, roughly 0.8 claw length.

Female. Easily identified, with fewer tubular spines on legs and lack of conspicuous femoral cement gland. Females slightly larger, however, possess smaller oviger than males. Juveniles have fully functional chela, crossing at tips, with simple teeth; chelifores slender and spinose. Juveniles are also easily identifiable with oviger buds.

Measurements. Holotype (in mm). Trunk length (chelifore insertion to tip of fourth lateral processes), 0.77; trunk width (across second lateral processes) 0.67; proboscis length 0.6; abdomen length 0.52; third leg, coxa I 0.2; coxa II 0.3; coxa III 0.23; femur 0.57; tibia I 0.6; tibia II 0.58; tarsus 0.1; propodus 0.38; claw 0.16.

REMARKS. This new species is closely related to two other species known from the Pacific: *A. tippula* Child, 1983 and *A. pacifica* Hilton, 1942. The primary difference between this new species and *A. tippula* is seen in the tubular spines on the lateral processes. *A. tippula* has low dorso-distal knobs and short lateral spines on lateral processes, lacking tubular spines on these regions. *A. fistella* has three articulated short tubular spines on the dorsodistal edge of the first three pairs of lateral processes and a single tubular spine on the last lateral process pair. *A. pacifica*, on the other hand, lacks any form of tubular spines on its lateral processes but possesses short postero-lateral spines bearing lateral setules ('feathered spines') on the two anterior pairs and no spines on the two posterior pairs. *A. pacifica* also lacks spines of any form on the antero-lateral corners of its trunk, while the same corners of *A. tippula* and *A. fistella* each have a short tubular, inarticulate spine.

The appendages of *A. tippula* and *A. pacifica* have tubular spines that are uniformly longer than those found on *A. fistella*. The first segment

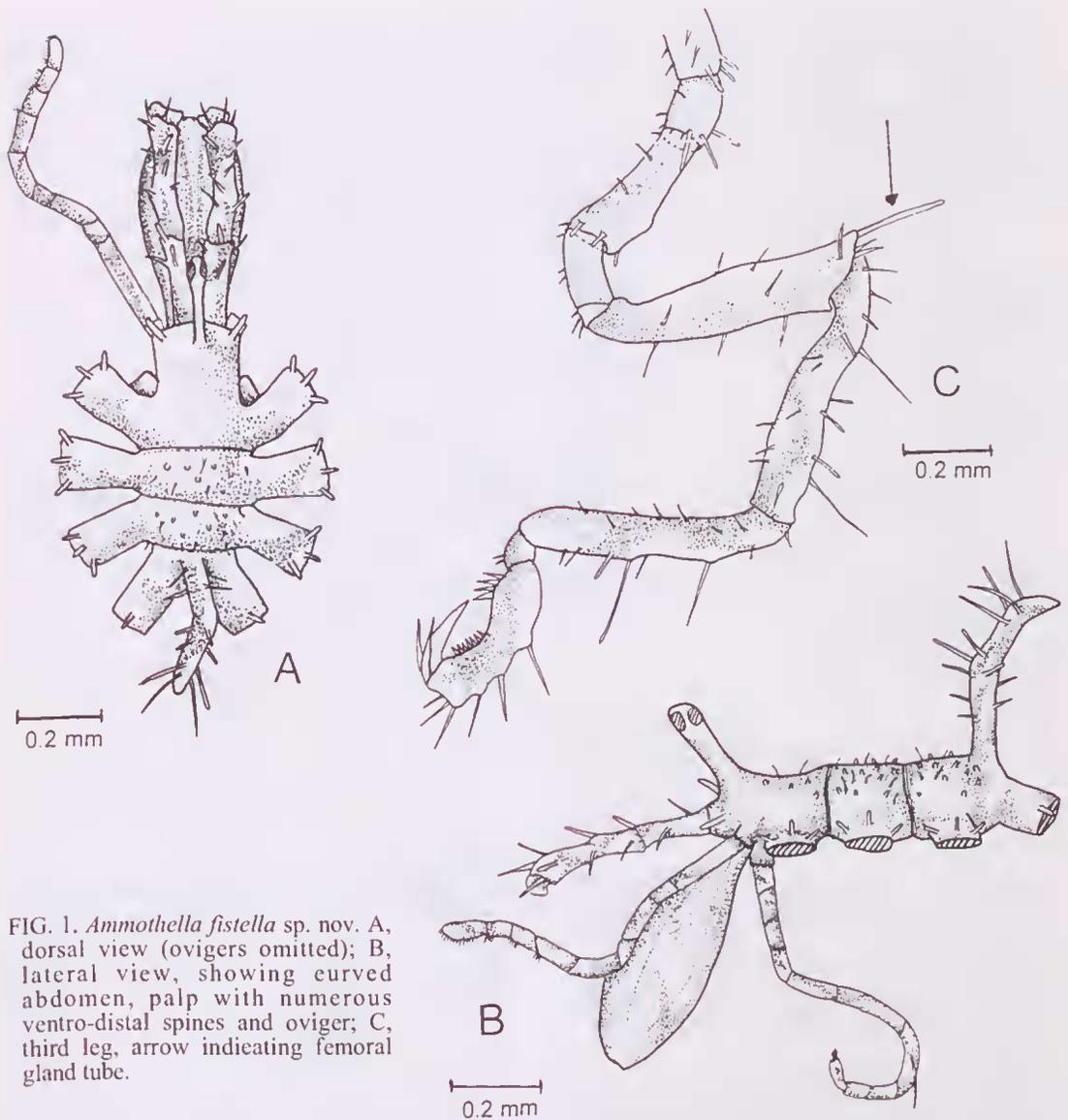


FIG. 1. *Ammothella fistella* sp. nov. A, dorsal view (ovigers omitted); B, lateral view, showing curved abdomen, palp with numerous ventro-distal spines and oviger; C, third leg, arrow indicating femoral gland tube.

on the chelifere of these two species has 1 dorsal tubular spine while the same segment on *A. fistella* has 4. The second scape segment of *A. fistella* has numerous short tubular spines, more than any of the other two related species.

Ammothella fistella is less closely related to its nearest geographic neighbour, *A. prolixa* Child, 1990, collected from Orpheus Island, north of Townsville, although they appear slightly similar. *Ammothella prolixa* has a more stretched or attenuated habitus with more slender appendages than the other species discussed. It

has fewer tubular spines and lacks spines or setae on its lateral processes.

CALLIPALLENIDAE Hilton, 1942

Callipallene catulus sp. nov.

(Fig. 2)

ETYMOLOGY. Latin, *catulus*, young of an animal; suggested by Dr Allan Child. It refers to the inflated, juvenile appearance of the trunk.

MATERIAL. Townsville, Rows Bay, intertidal rocky bund, on the green alga, *Cladophora prolifera* (Roth) in 0.5m, 1998, 1♂, holotype, (QMS105868) April–November 1998, coll. Lee; Paratypes, 1♂ with eggs, 3♀

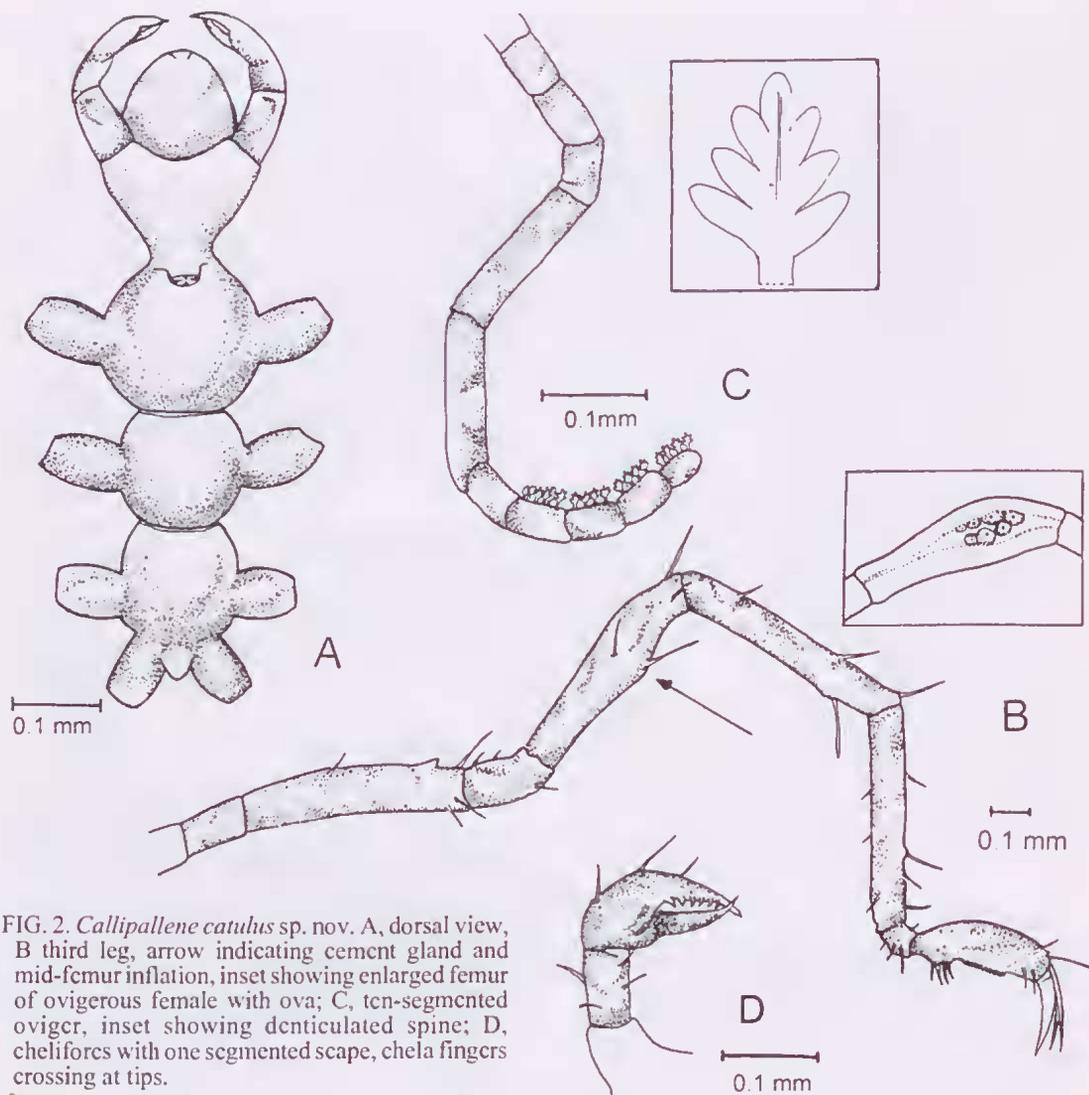


FIG. 2. *Callipallene catulus* sp. nov. A, dorsal view, B third leg, arrow indicating cement gland and mid-femur inflation, inset showing enlarged femur of ovigerous female with ova; C, ten-segmented oviger, inset showing denticulated spine; D, chelifores with one segmented scape, chela fingers crossing at tips.

ovigerous, 2 juv. (QMS105869); Paratypes 1 ♂ with eggs, ♀ ovigerous, coll. Lee, Syntypes 2 ♂, 2 ♀ (QMS105870).

DISTRIBUTION. Known only from Rowes Bay, Townsville, Queensland, in 0.5m tidal height.

DESCRIPTION. Body tiny, leg span 5.6mm. Trunk without ornamentation, segments inflated, first two segments fully segmented, third segment lacking complete segmentation lines. Lateral processes glabrous, short, widely separated by twice their diameter, no ornamentation. Abdomen small, low, almost glabrous. Ocular tubercle low, rounded dome, large eyes filling entire tubercle, lightly pigmented. Neck distinct, moderately long, very narrow proximally, expanded distally.

Proboscis short, semi globular, tapering to a small oral surface. Chelifores moderately small, scape one-segmented, about $2.5 \times$ longer than wide, armed with three or four distal and lateral setae longer than or as long as scape diameters. Chelae with similar dorsal setae, fully formed with denticulate immovable finger with 6 well-formed teeth, movable finger without teeth. Fingers cross at tips. Ovigers typical for the genus, strigilis segments with rounded denticulate spines in the formula 6:4:4:4, terminal claw absent, fifth segment the longest, with tiny dorsodistal tubercle having two short setae. Legs long and slender, cuticle transparent; few setae, all shorter than segment diameter

except dorsodistal seta; tarsus very short, with one heel spine and 2-3 short setae; propodus slender, moderately curved with 4 heel spines and 10-12 shorter sole spines and setae; main elaw long, about 2/3 propodal length; auxiliary elaws long almost as long as daetyl. Single cement gland, extruding ventrally through a single pore causing slight inflation at mid-femur.

Female. Slightly larger, neck slightly longer than male, with latero-distal apophysis on fifth segment of oviger lacking in female, as typical. Legs are similar except in ovigerous females where the femora are enlarged with ova in various stages of development.

Measurements. Holotype (in mm). Trunk length (cheliforme insertion to tip of fourth lateral processes) 0.64; trunk width (across second lateral processes) 0.27; proboscis length 0.21; abdomen length 0.15; third leg, coxa I 0.09; coxa II coxa III, 0.13; femur 0.64; tibia I 0.55; tibia II 0.65; tarsus 0.05; propodus 0.25; elaw 0.13.

REMARKS. This new species is rather similar to *Callipallene tridens* Nakamura & Child, 1988. These similarities are seen primarily in the inflated posterior trunk segments of each species. In both, the ocular tubercle is placed on a slight elevation and the segments are sutured the same way, and the third and fourth segments lacking the posterior sutures. Many species of this genus inflated posterior trunk segments but it is usually seen in juveniles, while the adult trunk segments are more slender. Many also lack the third trunk suture, as do *C. tridens* and *C. catulus*. The main differences between *C. catulus* and *C. tridens* lie in the lack of the specialised trident-shaped auxiliary elaws of *C. tridens*. *Callipallene catulus* also has longer and more slender appendages and different chelae, which serve to distinguish the two species. *Callipallene catulus* is extremely tiny, almost smaller than any *Callipallene* species described, except *C. tridens*, which is possibly the smallest known species at 3.5mm in leg span (Nakamura & Child, 1988).

PHOXICHILIDIIDAE Sars, 1891

Anoplodactylus glandulifer Stock, 1954

Anoplodactylus spec., Calman, 1923: 289.

Anoplodactylus glandulifer, Stock, 1954: 16-17. Child 1982: 273-274; 1988: 58-59. Nakamura & Child, 1988: 813. Müller, 1990: 74. Child 1990: 331. Müller, 1992: 166, figs 27-30. Stock 1992: 94-95. Bamber, 1992: 193-194. Stock 1994: 59.

Anoplodactylus multiclavus Child, 1977: 593-596, fig. 4; 1979: 58, fig 19d; 1982: 272. Müller, 1992: 166.

MATERIAL. Rowes Bay, rocky band on algae *Cladophora prolifera* (Roth) in 0.5m, April-November 1998, 1♂ with eggs, 2♀ (QMS105873); 3♂, 3♀.

DISTRIBUTION. This species is fairly widely distributed throughout the Indo-West Pacific, from the Red Sea to Kenya, Singapore, Hong Kong, the Marshall Islands, the Great Barrier Reef and also the Caribbean Sea (where it was described as *A. multiclavus*).

REMARKS. This species is one of a group of over 20 in this genus with multiple femoral cement gland openings (Child, 1988: 293-294, for a partial key). Femora have from 2-5 tiny cups located dorsally, with the numbers varying among legs of the same male specimen and also among specimens of a single population. Otherwise, this species is quite robust, with lateral processes closely set. Both chelae fingers are armed with teeth, and the movable finger is longer than its partner. Hints of palp buds on the anterior side of the first lateral processes and a long propodal lamina are characteristic of the species.

Anoplodactylus cribellatus Calman, 1923

Anoplodactylus cribellatus Calman, 1923: 285.

Anoplodactylus simplex Clark, 1963: 50-51, fig. 25A-F.

Stock, 1979: 158. Staples, 1982: 461, fig. 2A-B, pl. 1. figs C-D. Bamber, 1997: 46-49, fig. 2.

Anoplodactylus perforatus, Nakamura & Child, 1983:289, 1988:813,1991:29. Bamber, 1997: 46-49, fig. 2.

MATERIAL. Cleveland Bay, Townsville, dredge sample, 3-15m depth, sandy-muddy bottom, 1998 2♀, (QMS105872) coll. J. Cruz.

DISTRIBUTION. The individuals here collected would have been reported as *A. simplex* for which there were only two previous records from the east coast of Australia (Clark, 1963; Staples, 1982; but see Arango, 2003). However, Bamber (1997) examined the Indo-west Pacific *Anoplodactylus* species with very numerous cement gland pores concluding the synonymy of three species: *A. cribellatus* from the Andaman Islands, *A. perforatus* Nakamura & Child, 1983 from Japan and *A. simplex* from Australia. All specimens found in rather shallow waters.

REMARKS. The specimens collected here agree with the description of *A. simplex* syn. Clark showing 22-30 cement gland pores, a short abdomen and elongate propodus without a typical propodal lamina along its sole. After Bamber's examination of three similar species in which the number of cement glands pores overlap but the structures of the legs and ovigers are

identical among them (Bamber, 1997) it is reasonable to report these specimens as *A. cribellatus* and not *A. simplex*.

Anoplodactylus tubiferus (Haswell)

Phoxixhildium tubiferum Haswell, 1884: 1032, pl. 57, figs 1-5.

Anoplodactylus tubiferus Cole, 1904: 288. Flynn, 1919: 79-81, pl. xx., figs 12-14, pl. xxi., fig. 15. Nakamura & Child, 1991: 32. Stock, 1994: 67.

MATERIAL. Cleveland Bay, Townsville, dredge sample, 3-15m depth, sandy-muddy bottom, 4♂, 1♀, (QMS105871) coll. J.Cruz.

DISTRIBUTION. This species was first described in 1884 and has been collected from Madagascar and the Persian Gulf to Australia, Philippines and Japan. It is known to inhabit different depth strata, from 2-235m.

REMARKS. The extremely long and conspicuous cement gland makes the males of this species easily identifiable. It has a single cement gland tube more than twice as long as the femur, protruding almost vertically. This species has a very tall ocular tubercle and abdomen, very long distal spines on the lateral processes, and sometimes dorsally on the trunk. These features facilitate the identification of *A. tubiferus* (Staples, 1982: 457-459, fig. 2C). The species shows a general elongate habitus shared with other species from the western Pacific. A key for this species can be found in Nakamura & Child (1983: 41-42).

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